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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,814	03/26/2004	Kangguo Cheng	FIS920040018US1	2813
32074	7590	05/23/2006	EXAMINER	
INTERNATIONAL BUSINESS MACHINES CORPORATION DEPT. 18G BLDG. 300-482 2070 ROUTE 52 HOPEWELL JUNCTION, NY 12533			TOLEDO, FERNANDO L	
			ART UNIT	PAPER NUMBER
			2823	

DATE MAILED: 05/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

**Office Action Summary**

Application No.

10/708,814

Applicant(s)

CHENG ET AL.

Examiner

Fernando L. Toledo

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 17,18 and 20-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17,18 and 20 is/are allowed.
- 6) ☒ Claim(s) 21 and 22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 21 is rejected under 35 U.S.C. 102(b) as being anticipated by Kudelka et al. (US Patent Application Publication US 2001/0016398 A1).

3. In re claim 17, Kudelka, in the US Patent Application Publication US 2001/0016398 A1; figures 1 – 17 and related text, discloses a trench having a polygonal cross section comprising four straight main sides oriented with an angular difference between consecutive main sides; four inner projecting corners disposed between said four main sides, said four inner corners being located closer to a center of said polygonal cross section than said main sides; connecting lines connecting said inner corners with said main sides; and said polygonal cross section having a number of sides greater than four (Figures 4, 15 and 16).

### *Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 18 – 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kudelka as applied to claim 17 above, and further in view of Schrems et al. (U. S. Patent 6,200,873 B1).

6. In re claim 18, Kudelka discloses capacitor formed in a trench in a semiconductor substrate comprising a portion of said trench having a polygonal cross section comprising four straight main sides oriented with an angular difference between consecutive main sides; four inner projecting corners disposed between said four main sides, said four inner corners being located closer to a center of said polygonal cross section than said main sides; connecting lines connecting said inner corners with said main sides; a node dielectric disposed on interior surfaces of said lower portion of said trench and said polygonal cross section having a number of sides greater than four (Figures 4, 15 and 16).

Kudelka does not disclose a conductive center electrode disposed within said trench and abutting said node dielectric.

However, Schrems discloses that to finish a trench capacitor it needs a conductive filling material 161 (Abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form a conductive material in the invention of Kudelka to finish the trench capacitor as taught by Schrems.

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7. In re claim 19, Kudelka discloses further comprising an upper portion of said trench retaining its original cross section and a lower portion of said trench disposed within a buried plate and having said polygonal cross section (Figures 4, 15 and 16).

8. In re claim 20, Schrems discloses further comprising a transistor formed within said upper portion of said trench connected between said center electrode and a first cell contact, said transistor being controlled by a gate connected to a second cell contact, said capacitor and said transistor together thereby forming a DRAM cell (Figure 1).

*Allowable Subject Matter*

9. Claims 17, 18 and 20 are allowed over the prior art of record.

*Response to Arguments*

10. Applicant's arguments with respect to claims 17, 18 and 20 have been considered but are moot in view of the new ground(s) of rejection.

*Conclusion*

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after

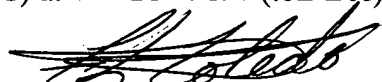
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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando L. Toledo whose telephone number is 571-272-1867. The examiner can normally be reached on Mon-Fri 12pm-7:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Fernando L. Toledo  
Patent Examiner  
Art Unit 2823

flt  
18 May 2006